PAS series of
4-Quadrant Amplifiers

PAS 1000

The Reference Source
for all applications

- ✓ **Extremely low harmonic distortion - even under very non-linear load conditions**
- ✓ **Very fast slew rate > 52V/µs (rise time < 5µs at 230V_{rms} as required by EN 61000-4-11)**
- ✓ **Operates from DC up to 5kHz large signal bandwidth (-3dB) - optional to 15kHz or 30kHz**
- ✓ **Small signal bandwidth up to 50kHz or 100kHz**
- ✓ **High long-term overload characteristic (up to 1-hour)**
- ✓ **High short-term overload characteristic (for 5 … 10mins.)**
- ✓ **Very high peak-load ability (up to 5ms)**
- ✓ **Very low internal resistance**

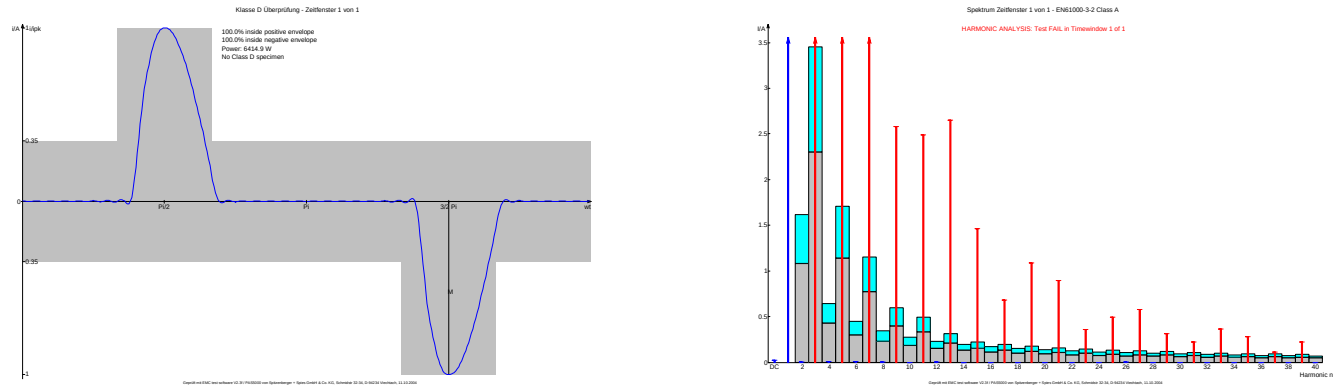
The Real 4-Quadrant Amplifier

Compliance with the requirements of the European EMC directive requires a statement of „product conformance“ to a variety of emission and immunity specifications. These specifications define not only the type of test, but also the technical requirements for the test instrumentation. In particular, in the field of low-frequency conducted phenomena, an AC/DC-voltage source is required for almost all types of test. In order to comply with these requirements a 4-quadrant amplifier has been developed which is based upon a linear push-pull design. Some of the remarkable features of this amplifier design include it’s ironless output stage, extensive use of negative feedback over all amplifier stages, an extended frequency range and a very low internal resistance.

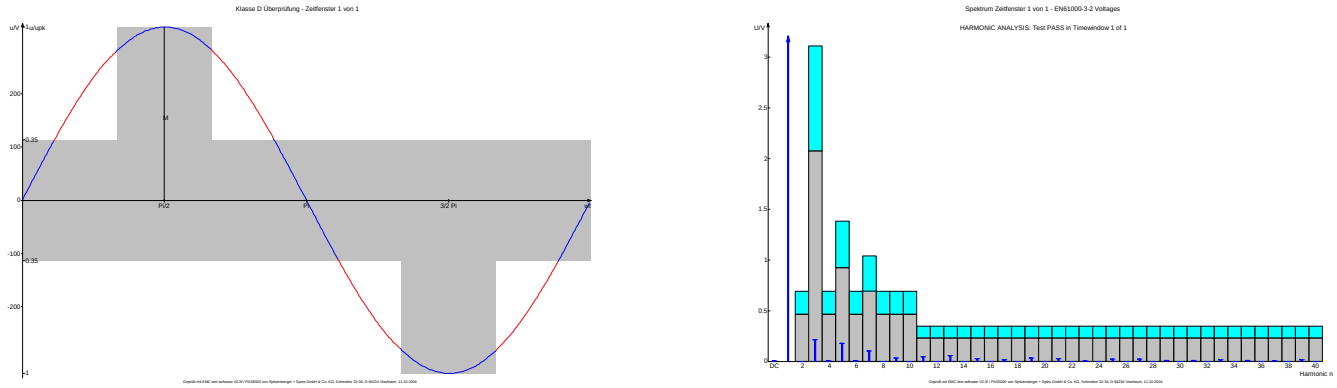
Field of application

Extremely low harmonic distortion

The voltage source meets the extremely rigorous requirements of the standard EN 61000-3-2, even under very non-linear conditions.



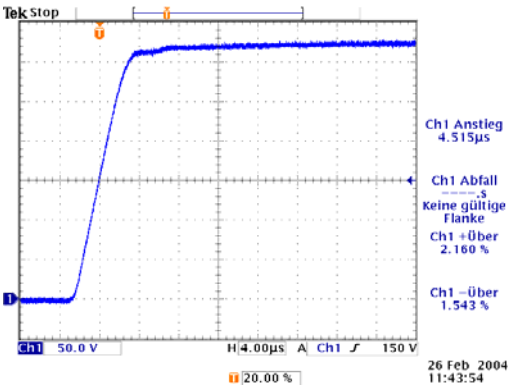
Input current ($41A_{rms}/106A_p$) and frequency spectrum of the EUT



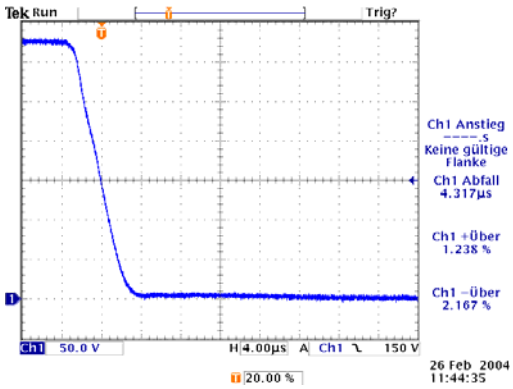
Output voltage and frequency spectrum of the voltage source (PAS 5000)

Very fast rise time

Due to the very fast slew rate of >52V/µs the requirements of EN 61000-4-11 are fully met in practice.



rise time



fall time

Control

To control the amplifier a range of different oscillators, including IEEE 488 controlled (e.g. SyCore units), are available.

With a guaranteed future

Instead of many individual voltage sources, the use of a single universal voltage source is both efficient and economical. Apart from this, the PAS series of voltage sources are also prepared to meet the requirements of additional standards such as EN 61000-4-13, EN 61000-4-14, EN 61000-4-17, EN 61000-4-27, EN 61000-4-28, EN 61000-4-29, EN 61131-2, EN 61496-1 and German Lloyd.

Very low internal resistance

The extremely low internal resistance of the amplifier guarantees a measurement in full conformance with the requirements of EN 61000-3-3 even under dynamic load conditions.

Testconditions: 230 V / 50 Hz / Phase: L1 / Observations: 3 x 10 min / Ztest: (0.40+j0.25) Ohm

FLICKER: Test FAIL! Max. permitted Imp.: (0.094+j0.059) Ohm

Time	Pmax	Pst	Sliding Plt	d(t)>3.30% [s]	dmax [%]	dc [%]	PASS	FAIL
12:51:28	113.300	2.6250	2.6250	- . - - -	5.573	0.108		X
13:01:28	24.060	2.3970	2.3970	- . - - -	2.541	0.096		X
13:11:28	19.660	2.3570	2.3570	- . - - -	2.366	0.002		X
Limits:		1.000	0.650	0.500	4.000	3.300		
Plt: 1.553090 (calculated over 12 periods)								
Evaluated: PST								

FLICKER: Source test PASS!

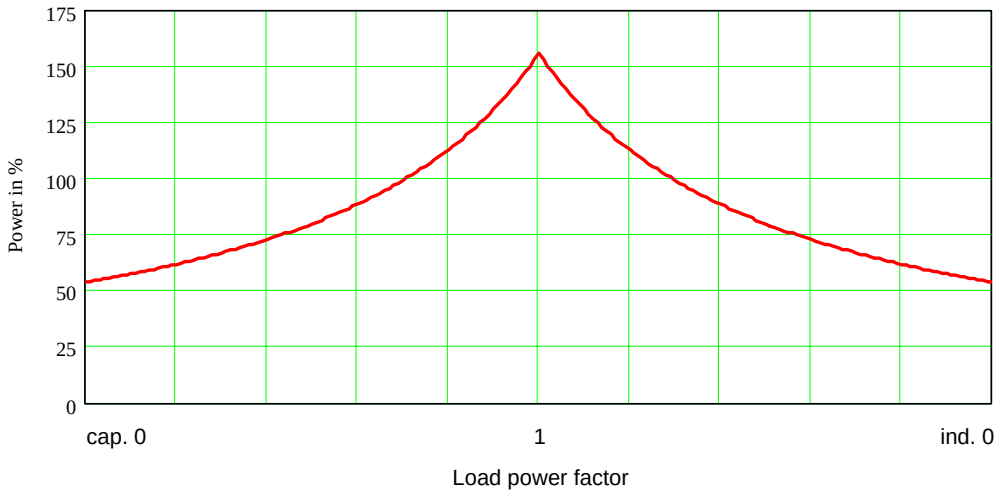
Time	Pmax	Pst	Sliding Plt	d(t)>3.30% [s]	dmax [%]	dc [%]	PASS	FAIL
12:51:28	0.006	0.0550	- . - - - -	- . - - -	0.087	- . - - -	X	
13:01:28	0.001	0.0260	- . - - - -	- . - - -	0.108	- . - - -	X	
13:11:28	0.001	0.0230	- . - - - -	- . - - -	0.126	- . - - -	X	
Plt: 0.025377 (calculated over 12 periods)								
Evaluated: PST <= 0.4 dmax < 20% dmax1								

Geprüft mit EMC test software V2.3f / PASS000 von Spitzenberger + Spies GmbH & Co. KG, Schmidstr 32-34, D-94234 Viechtach, 11.10.2004

Flicker measurement with photocopier as the EUT

Extremely high loadability

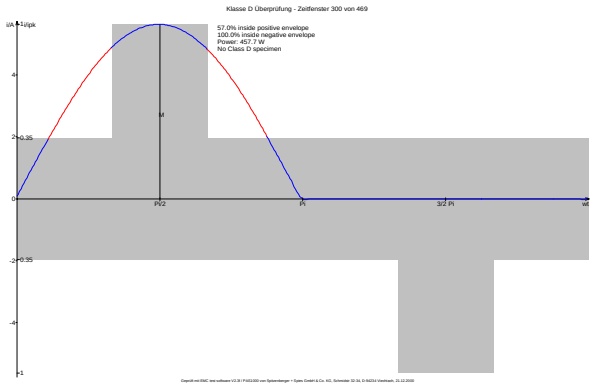
150% of rating is available in the case of a real load. Amplifier stability is absolutely assured when operating with either inductive or capacitive loads.



Performance characteristic

DC-Simulation

The directly coupled ironless amplifier output-stage makes the generation of DC signals possible. All test devices requiring a DC content within their input current can be supplied without problem.



Long life expectancy and high reliability

The PAS – series is the perfect programmable voltage source for all your test equipment and production line requirements.